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# Server+ Guide to Advanced Hardware Support

James I. Conrad

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## **Server+ Guide to Advanced Hardware Support**

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# BRIEF Contents

INTRODUCTION	xiii
CHAPTER ONE Defining a Server	1
CHAPTER TWO Server Planning	39
CHAPTER THREE Motherboard Architecture, Processors, Memory, and BIOS	85
CHAPTER FOUR Server Power and Rack Installation	131
CHAPTER FIVE Hard Disk Interfaces and RAID	173
CHAPTER SIX Server Upgrades	231
CHAPTER SEVEN Networking	283
CHAPTER EIGHT Configuring a Network Operating System	335
CHAPTER NINE Network Operating System Services and Applications	389
CHAPTER TEN Disaster Planning	447
CHAPTER ELEVEN Performance Monitoring and Optimization	495
CHAPTER TWELVE Troubleshooting and Problem Determination	541
APPENDIX Exam Objectives for Server+ Certification	593
GLOSSARY	601
INDEX	623

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---

TABLE OF

# Contents

---

## INTRODUCTION

xiii

## CHAPTER ONE

### Defining a Server

1

Does Your Network Need a Server? 2

Comparing Peer-to-Peer and Client-Server Models 2

Peer-to-Peer 3

Client-Server 6

Server Functions and Benefits 8

Services 8

Security 8

Performance 12

Storage Capabilities 15

Access to Applications 15

Centralized Management 18

Cost Effectiveness 18

Classes of Servers 22

PC Servers 22

Mainframe or “Big Iron” 25

The Minicomputer or Midrange Computer 26

Chapter Summary 26

Key Terms 28

Review Questions 30

Hands-on Projects 34

Case Projects 37

## CHAPTER TWO

### Server Planning

39

Determining the Business Purpose 40

Do We Really Need This Server Right Now? 40

Is the Expense of the Server Offset in Savings? 41

Is the Timing of a Server Purchase Appropriate? 41

Is Sufficient Expertise Available to Operate and

Maintain the Server? 42

Anticipating User Demand 42

How Many Users Will Connect to the Server? 42

What Is the Nature of the User Access? 43

Should Users Be Able to Access the Server Directly? 43

Planning for Interoperability 43

Server Placement 47

Intra-Site Server Placement 49

Inter-Site Server Placement 50

Creating the Network Diagram 51

---

Planning Physical Site Readiness	52
Temperature	53
Air Quality	55
Humidity	56
Flooring	58
Power	62
Availability	62
Quality	64
Electromagnetic Interference	65
Disaster Planning	67
Fire Detection and Suppression	67
Flood Considerations	68
Using Space Effectively	69
Planning a Secure Location	71
I Have Seen the Enemy ...	72
Restricting Access to the Server Room	72
Monitoring Access to the Server Room	73
Chapter Summary	74
Key Terms	76
Review Questions	78
Hands-on Projects	81
Case Projects	84

## CHAPTER THREE

### Motherboard Architecture, Processors, Memory, and BIOS

85

Get on the Bus	86
Clock Frequency	86
Chipset Function	87
Hierarchical Bus	88
Accelerated Hub Architecture	91
Bus Interfaces	92
ISA	92
EISA	92
PCI	92
Accelerated Graphics Port (AGP)	97
Processors	98
Processor Speed	98
Cache Memory	99
Server Processors	100
64-Bit Processors	103
Memory	104
SIMM Modules	104
EDO	105
DIMM Modules	105
SDRAM	106
RDRAM	107
DDR SDRAM	107
Interleaving	108
Buffered and Registered Memory	110
Error Correcting Code (ECC)	110
CMOS, BIOS, and POST	111
CMOS	111
BIOS	111

---

Chapter Summary	115
Key Terms	120
Review Questions	123
Hands-on Projects	127
Case Projects	129
<b>CHAPTER FOUR</b>	
<b>Server Power and Rack Installation</b>	<b>131</b>
Supplying Power to the Server	132
Power Supply	132
Calculating Server Power Requirements	134
Uninterruptible Power Supply	136
The Rack	144
Physical Characteristics	144
Cooling	147
Configuration	149
Power	155
The KVM	158
Rack Installation Tips	160
Chapter Summary	161
Key Terms	163
Review Questions	164
Hands-on Projects	167
Case Projects	171
<b>CHAPTER FIVE</b>	
<b>Hard Disk Interfaces and RAID</b>	<b>173</b>
Hard Disk Components	174
Disk Platters	175
Drive Heads	175
Partitions and Logical Drives	177
Creating a Partition	177
Logical Drives	178
File Systems	179
FAT/FAT32	179
NTFS	180
HPFS	180
Linux/UNIX File Systems	181
NetWare	181
The IDE Interface	182
ATA-1	183
ATA-2	183
ATA-3	184
ATA-4	184
ATA-5	185
ATA-6	186
ATA Cable	186
Master, Slave, and Cable Select	189
The Pros and Cons of IDE/ATA	190
The SCSI Interface	192
SCSI-1	192
SCSI-2	193
SCSI-3	193

---

SCSI Configuration	196
SCSI Cables and Connectors	196
Signaling	199
SCSI Termination	201
Drive Configuration (SCSI ID and LUN)	203
SCSI Pros and Cons	206
SCSI Summary	207
Fibre Channel	208
RAID	210
RAID-0	210
RAID-1	211
RAID-0+1	212
RAID-5	213
Software RAID vs. Hardware RAID	215
Chapter Summary	215
Key Terms	217
Review Questions	222
Hands-on Projects	226
Case Projects	229

## CHAPTER SIX

### Server Upgrades

**231**

Preparing for a Server Upgrade	232
When to Upgrade the Server	232
Timing the Upgrade	234
Notifying Users	234
Confirm That You Have Necessary Upgrade Components	235
Planning for Failure	236
Verifying System Resources	237
Making an Inventory	239
Test and Pilot	240
Performing the Upgrade	241
Avoiding Electrostatic Discharge	241
Upgrading the Processor	245
Upgrading Memory	253
Updating the BIOS	259
Recovering the BIOS	260
Upgrading a Power Supply	261
Upgrading Adapters	267
Upgrading the UPS	268
Server Upgrade Checklist	269
Chapter Summary	270
Key Terms	272
Review Questions	273
Hands-on Projects	276
Case Projects	281

## CHAPTER SEVEN

### Networking

**283**

Network Topologies	284
Bandwidth	284
Bus	284
Ring	285



Star	287
Hybrid Topologies	288
Protocols	289
NetBEUI	289
IPX/SPX	289
TCP/IP	290
Verifying TCP/IP Configuration and Connectivity	291
Network Media Access Methods	294
Token Ring	295
Ethernet	295
Network Equipment	298
Bridges	298
Switches	299
Routers	300
Network Cabling	301
Thicknet	301
Thinnet	301
Shielded Twisted Pair (STP)	302
Unshielded Twisted Pair (UTP)	304
RJ-45 Pin Assignments	305
Crossover Cables	306
How to Cut and Crimp RJ-45 Connectors	306
10BaseT	311
100BaseT	311
Fiber Optic Cabling	311
Network Adapters	312
Adaptive Fault Tolerance (AFT)	313
Adaptive Load Balancing (ALB)	313
Link Aggregation	315
Networking with a Modem Pool	315
Chapter Summary	319
Key Terms	323
Review Questions	326
Hands-on Projects	329
Case Projects	333

## CHAPTER EIGHT

### Configuring a Network Operating System

**335**

General NOS Configuration Concepts	336
Hardware Requirements	336
NOS Installation	336
Virtual Memory/Swap Files	337
Performing Upgrades	337
Proper Shutdown	338
Novell NetWare	338
Versions	340
NetWare 5.1 Minimum Requirements	341
Installing NetWare 5.1	342
Creating NetWare Swap-File Space	346
Performing an Upgrade to NetWare 5.1	346
Performing a Proper NetWare Shutdown	347
UNIX/Linux	347
Versions	349
Linux Minimum Hardware Requirements	349

---

Installing Linux	350
Performing a Proper Linux Shutdown	354
OS/2	355
Versions	356
OS/2 Minimum Hardware Requirements	356
Installing OS/2	357
Performing an Upgrade to OS/2 Warp	359
Creating OS/2 Swap-File Space	359
Performing a Proper OS/2 Shutdown	359
Windows NT Server	360
Windows NT Server 4.0 Minimum Hardware Requirements	361
Installing Windows NT 4.0 Server	361
Upgrading to Windows NT 4.0 Server	366
Creating Windows NT 4.0 Swap-File Space	367
Performing a Proper Windows NT 4.0 Shutdown	367
Windows 2000	368
Versions	369
Windows 2000 Minimum Hardware Requirements	370
Installing Windows 2000 Server	370
Upgrading to Windows 2000 Server	372
Creating Windows 2000 Swap-File Space	373
Performing a Proper Windows 2000 Shutdown	373
Updating a Network Operating System	374
Chapter Summary	375
Key Terms	378
Review Questions	381
Hands-on Projects	384
Case Projects	388

## CHAPTER NINE

### Network Operating System Services and Applications 389

Services	390
DHCP	390
DNS	394
WINS	401
Mail Services	406
Email Protocols	407
Email Server Applications and Requirements	408
Web and FTP Servers	410
Remote Access Service	413
Configuring RAS on a Server	416
Fax Services	418
SNA Server	420
Application Servers	421
Monitoring Protocols	421
SNMP	422
DMI	425
The Server as a Network Device	425
The Server as a Router	426
The Server as a Firewall	428
Chapter Summary	429
Key Terms	432
Review Questions	436
Hands-on Projects	439
Case Projects	446

---

**CHAPTER TEN****Disaster Planning****447**

Backups	448
Types of Backup Hardware	448
Automated Tape Solutions	451
Backup Software	459
Storing and Securing Backups	460
Backup Types	461
Develop a Backup Strategy	463
Document the Process	467
High Server Availability and Redundancy	468
Failover	470
Spare Parts	470
SNMP Settings	471
Server Management and Maintenance	472
Server Management Software	472
Physical Care and Maintenance	475
Developing a Disaster Recovery Plan	476
Using Alternate Sites	477
Site Management	478
Chapter Summary	480
Key Terms	483
Review Questions	485
Hands-on Projects	488
Case Projects	494

**CHAPTER ELEVEN****Performance Monitoring and Optimization****495**

Monitoring the Server	496
Using Monitoring Tools	497
IBM OS/2	498
Linux	499
NetWare	501
Windows NT 4.0	503
Windows 2000	505
Establishing a Baseline	509
What Is a Bottleneck?	509
When to Create a Baseline	510
Putting the Tools to Work	511
Capacity Planning	512
Processor	513
Acceptable Processor Performance	513
Processor Solutions	513
Memory	518
Acceptable Memory Performance	518
Memory Solutions	519
Hard Disk	521
Acceptable Hard Disk Performance	521
Hard Disk Solutions	522
Network	525
Acceptable Network Performance	526
Network Solutions	526

Chapter Summary	528
Key Terms	530
Review Questions	531
Hands-on Projects	535
Case Projects	539

## **CHAPTER TWELVE**

### **Troubleshooting and Problem Determination 541**

Troubleshooting and Problem Determination	542
Stay Calm	542
Investigate the Problem	542
Check the Obvious	551
Physical Connections	552
Come to Your Senses	554
Diagnostic Tools	555
Network Cable Diagnostic Devices	555
Connectivity Utilities	556
Operating System Utilities	559
System and Hardware Diagnostic Utilities	562
Working Remotely	565
Wake-on LAN	565
Remote Administration Tools	566
Booting an Unbootable Server	569
More Drastic Measures	572
Troubleshooting Viruses	572
Troubleshooting Specific FRUs	573
Power Supply	574
Memory	574
Hard Disks	575
SCSI and RAID Troubleshooting	576
Adapter Cards	578
Processor	579
Troubleshooting Tips	579
Getting Help	580
Chapter Summary	582
Key Terms	584
Review Questions	584
Hands-on Projects	587
Case Projects	592

## **APPENDIX**

### **Exam Objectives for Server+ Certification 593**

### **GLOSSARY 601**

### **INDEX 623**

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# Introduction

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**S**erver+ *Guide to Advanced Hardware Support* takes you beyond generic PC repair and administration into the world of high-end PC servers. This book will enable you to feel confident when talking with businesspeople as well as technical people about the many features and technologies of server administration and hardware. It will also help you make wise decisions concerning how your business career is linked to server management. If you are planning a technical career, consider this book the foundation of your education about servers.

This book provides support in preparation for CompTIA's Server+ Certification examination. This new, vendor-neutral certification focuses on server hardware, configuration, administration, and troubleshooting. Obtaining certification increases your ability to gain employment and improve your salary. To get more information on Server+ Certification and its sponsoring organization, the Computing Technology Industry Association, visit their web site at [www.comptia.org](http://www.comptia.org).

## FEATURES

To ensure a successful learning experience, this book includes the following pedagogical features:

- **Learning Objectives:** Every chapter opens with a list of learning objectives that sets the stage for you to absorb the lessons of the text.
- **Appealing Art Program:** The text is full of diagrams, drawings, screen captures, and photographs that make the many server technologies easy to follow and understand.
- **Step-by-Step Procedures:** The book has step-by-step instructions that you can easily follow for hands-on experience on all aspects of working with servers, including upgrading and repairing server hardware, configuring the network to which servers connect, and configuring and installing server operating systems along with their various applications and services.



**Tip** icons highlight additional helpful information related to the subject being discussed.



**Caution** icons highlight potential pitfalls and dangers of which you should be aware.

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**Note** icons highlight additional information about the subject being discussed.

- **End-of-Chapter Material:** The end of each chapter includes the following features to reinforce the material covered in the chapter:
  - **Chapter Summary:** A bulleted list is provided that gives a complete but brief summary of the chapter.
  - **Key Terms:** A list of all new terms and their definitions.
  - **Review Questions:** To test knowledge of the chapter, review questions cover the most important concepts of the chapter.



**Hands-on Projects** help you apply the knowledge gained in the chapter.



**Case Projects** present scenarios that will help you develop server planning, troubleshooting, and optimization techniques relevant to the material in each chapter.

- **CoursePrep® Software Server+ Test Preparation CD-ROM:** 50 test preparation questions, powered by MeasureUp®, simulate the testing environment so you can practice for exam day.

Before using this book, you should have moderate computer experience and at least a basic understanding of most PC terms and technologies. Many readers might already have a previous certification, such as CompTIA A+ or Network+ certification, but they are not prerequisites. After completing the book, you will have mid-level to upper-level knowledge of server administration and technology. After becoming Server+ certified, you will be able to fulfill the roles of job titles such as:

- Service manager
  - Technician
  - Systems engineer/administrator
  - Help desk staff
  - Service and repair professional
  - System analyst and integrator
  - PC support specialist
  - Network engineer/administrator/analyst/architect/manager/specialist
-

For instructors using this book in a classroom environment, the following teaching materials are available on the Instructors Resource Kit CD-ROM:

**Electronic Instructor's Manual:** The Instructor's Manual that accompanies this textbook includes a list of objectives for each chapter, detailed lecture notes, suggestions for classroom activities, discussion topics, and additional projects and solutions.

**ExamView®:** This textbook is accompanied by ExamView, a powerful testing software package that allows instructors to create and administer printed, computer (LAN-based), and Internet exams. ExamView includes hundreds of questions that correspond to the topics covered in this text, enabling students to generate detailed study guides that include page references for further review. The computer-based and Internet testing components allow students to take exams at their computers, and also save the instructor time by grading each exam automatically.

**PowerPoint Presentations:** This book comes with Microsoft PowerPoint slides for each chapter. These are included as a teaching aid for classroom presentation. They can be made available to students on the network or printed for classroom distribution.

## ACKNOWLEDGMENTS

A special thanks to Stephen Solomon for offering this book to me, and to Lisa Egan, the Senior Product Manager, whose dedication to this book appears on every page. Thanks, Lisa, for your guidance through our very tight deadline schedule. Thanks to Deb Kaufmann, the Development Editor, for your humor, encouragement, and top-notch professionalism all along the way. I could never have made this book what it is without you. Thanks to Robert (Mac) McMullen, Michael Shannon, and Stephen Brown, who contributed their extensive server and networking knowledge to this book. Thanks to the artists who rendered my chicken-scratch drawings into high-quality, illuminating graphics.

Writers always need other eyes to review their work, and for this book I had several reviewers whose extensive experience and knowledge were very helpful. I know that you all have very demanding full-time jobs that required you to make sacrifices to help with this book. Thanks to the reviewers and technical editors:

John Anderson	AND-R Companies
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A very special thanks goes to Bob Pierson, whose networking and server knowledge is unbelievable.

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## DEDICATION

All my love to my wife, Jana, an author herself. You never once complained about late nights and time away from family. Thanks to my three children (Kenley, Marina, and Cooper), who, even though I work in a home office, had to do without me for months while I was behind the locked door. Thanks to all of you for your prayers.

James I. Conrad (MCSE, MCP+I, Server+) is a full-time author who has written several books on networking and Microsoft Windows products, and is President of Accusource Computer Consulting, Inc., a company that hires contract writers for technical publications. James has taught seminars to thousands of IT professionals in the United States and Europe, and continues to teach with trainAbility of Scottsdale, AZ, a premier Windows 2000 and Windows Exchange training organization.

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## COMPUTER REQUIREMENTS

You can perform several of the Hands-on Projects on a personal computer, but you will see as you go that a standard PC might not be sufficient for some of the server projects. The course assumes you will have access to:

- **Windows 2000 Server or Advanced Server installation CD.** Most projects use Windows 2000.
- **Red Hat Linux version 7.0 or better.** Although Linux is not included in the Hands-on Projects, you should install and familiarize yourself with the Linux interface and tools.
- **Novell NetWare version 5.1 or better CD**
- **Two or more servers.** For most projects requiring two computers, you could substitute one of the servers for any Windows computer.



**Suggestion for instructors.** Install Windows 2000 and image the hard drive using imaging software or tape backup software. After completing projects, you can restore the server(s) to the original configuration by restoring the image.

- **Microsoft Internet Explorer 4.0 or better, or Netscape Navigator.** Some Hands-on Projects require Internet access. You can download a copy of Internet Explorer from [www.microsoft.com/windows/ie/](http://www.microsoft.com/windows/ie/) and Netscape Navigator from [www.netscape.com](http://www.netscape.com).
  - **A server rack at least 24 U in height, and any rack-mountable server** or other network device such as a hub or switch.
  - **A motherboard** capable of at least two processors.
  - **A redundant, hot-swappable power supply**
  - **A UPS**
  - **A KVM** (keyboard, video, mouse) device
  - **A PDU**
  - **A scrap hard disk with the cover removed** (for easy observation of internal parts)
  - **Two IDE hard disks and a 40-pin, 80-conductor IDE cable**
  - **An IDE host adapter** (unless the motherboard has an IDE connection)
  - **A Windows 98 boot floppy**
  - **A blank floppy**
  - **Two or three SCSI hard drives and a compatible SCSI cable**
  - **A SCSI host adapter**
  - **A SCSI terminator** compatible with the above SCSI equipment
-

- **An ESD grounding kit** consisting of a wrist strap with alligator clip and grounding mat
- **A digital multimeter**
- **Two identical processors**, one already installed on the motherboard
- **At least one memory module compatible with the motherboard**
- **A PCI network card with older (but compatible drivers)** that will be updated via the Web
- **Four or more RJ-45 jacks** per student
- **Six feet or more of Cat 5 cable** per student
- **Diagonal cutters**
- **RJ-45 crimper**
- **A hub**
- **A tape backup drive and compatible tape media**

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